Appendix H
Lubrication and Lubricant Data

H-1. Information Provided by Various Corps Offices

The following items of information were provided from various Corps offices and are included to assist readers in solving lubrication problems.

a. Item No. 1. Taken from correspondence from Mr. Waite of Broderick and Bascom Rope Company regarding lock gates at Melvin Price Lock and Dam, Alton, Illinois. A number of questions were addressed subsequent to a site visit by one of their personnel.

(1) Gate and rope type. Multi-leaf lift gates/ 1-1/2", 6x30G Fattened Strand, Type 304 Stainless Steel, Right Lay Regular Lay IWRC. "Cables run in dirty, debris-filled, river water," per St. Louis District.

(2) Problem/solution. A quotation regarding lubrication: "We recommend lubricating the wire rope with a field dressing. The field dressing we recommend is Witco Allied Kelite X-38-AC. A typical specification listing for the compound is attached. We suggest covering the tension members with X-38-AC to prevent corrosion from bird droppings. This is a penetrating type of lubricant. The proper interval is related to the degree of difficulty required to clean it off for inspection, and its tenacity against water, etc. We suggest beginning with a light application monthly, and then rationalizing the frequency of application, based on experience."

(3) Additional information. The manufacturer claims that "X-38-AC is a low viscosity, solvent reduced dressing designed to provide protection in either acid or salt environments. Once its solvent carrier evaporates, X-38-AC sets to a pliable film which resists moisture infiltration and throw-off." For more information:

Allied-Kelite, A Witco Company
5301 West 66th Street, Chicago, IL 60638
(312)767-8447

b. Item No. 2. Information from the St. Louis District which was sent to Omaha District regarding lock gates at Melvin Price Lock and Dam.

(1) Gate and rope type. Multi-leaf lift gates/1-1/2", 6x30G Fattened Strand, Type 304 Stainless Steel, Right Lay Regular Lay IWRC.

(2) Problem/solution. The problem was that most lubricants are opaque and make wire rope inspection difficult. The St Louis District tried two transparent lubricants, ALMASOL 2001 and ALMASOL 2002. Apparently they are satisfied with the results.

(3) Additional information. ALMASOL 2001 is for the inside of the rope and the manufacturer claims it *". . . is a highly penetrating fluid lubricant with excellent load carrying capacity. Designed to penetrate to and throughout the core of wire ropes either standing or running. . . Contains a petroleum solvent to enhance penetration capabilities . . ."* ALMASOL 2002 is for the outside of the rope and the manufacturer claims it is "A fluid, coating wire rope lubricant which provides a non-tacky durable self-healing film to reduce wear and corrosion under extreme conditions of load and moisture." For more information:

Lubrication Engineers, Inc.
3851 Airport Freeway, P.O. Box 7128
Fort Worth, TX 76111
(817)834-6321

c. Item No. 3. Information from the Seattle District which was sent to Omaha District regarding lubrication of wire ropes at Albeni Falls Dam and Lake Washington Ship Canal.

(1) Gate and rope type. The lubricated wire ropes at both Albeni Falls Dam and at the Lake Washington Ship Canal are for cranes but are not otherwise specified.

(2) Problem/solution. Apparently a number of rope test sections were lubricated with various lubricants at Albeni Falls Dam. They ". . . have since used Lubriplate Chain and Cable Fluid PT 13539, as

it looked good in our test, appears to soak well, and seems to provide good protection without all the mess." At the Lake Washington Ship Canal they use a product called Silver Spur with moly-disulfide, manufactured by Dynaco. They state, ". . . we have seen extremely good results with this product. We have been using the product for approximately 5-7 years and have seen little, if any, deterioration due to rust/corrosion. We have looked into biodegrdable products, but have as yet to find out which will hold up well under our weather and load characteristics."

d. Item No. 4. Information from the Portland District which was sent to Omaha District regarding lubrication of wire ropes.

(1) Gate and rope type. Not specified.

(2) Problem/solution: From fax: "Many projects throughout the COE use standard oil-based lubrication for wire rope which when put into waterways leaves a sheen of oil on the surface as well as pollutes the water in general. This unacceptable practice will continue until the projects are provided with an effective wire rope lubricant that is acceptable to the Environmental Protection Agency. One such lubricant that appears to have possibilities is:

PRELUBE 19 as sold by Grinard Company Inc.
900 Port Reading Avenue
P.O. Box 221
Port Reading, New Jersey 07064
Tel (908) 541-6661 Fax (908) 541-1918

This lube has been used in the oceans by the USCG and Oregon State University, College of Oceanography. Both have had good results concerning corrosion protection, center penetration, and no apparent wash off. Contact company above for MSDS and additional test results."

e. Item No. 5. Information from the Lower Mississippi Valley Division which was sent to Omaha District regarding lubrication of wire ropes.

(1) Gate and rope type. Sector gates at Bayou Dupre, Bayou Bienvenue, Golden Meadow, and Larose all with 1-1/8" diameter, 6x37 fiber core, Type 1, Class 3 in accordance with Fed Spec RR-W-410A.

(2) Problem/solution. The letter stated, ". . . the wire rope is not submerged or in direct contact with the water. The major problem with wire rope on these structures is that they require a heavy grease coating to reduce corrosion. Because the wire rope runs horizontally in front of the gates and through the machinery pits and the grease is fluid in warm weather, there is a constant problem with grease drippings along the front portion of the gates and over a good portion of the machinery pit. Considering the infrequent use of the structures and the problems with the grease, stainless steel wire rope should have been used."

f. Item No. 6. Information from the Vicksburg District which was sent to Omaha District through LMVD regarding lubrication of wire ropes.

(1) Gate and rope type. Not specified.

(2) Problem/solution. The letter stated, "Changed . . . to Certified CCX77 lubricant. For wire rope that had been changed every 5 years, we were able to extend the life to 7 years due to better penetration . . . does not have to be heated to be applied, resulting in safer working conditions."

g. Item No. 7. An Omaha District trip report concerning a visit to Oahe Dam outlet works, dated August 1973.

(1) Gate and rope type. Vertical lift gates/1-1/4", 6X37 IWRC Galvanized Improved Plow Steel.

(2) Problem/solution. The visit was scheduled to include an inspection of the outlet service gate wire ropes with respect to corrosion. Gate Nos. 2 and 3 ropes, which had never been lubricated were compared to the Gate No. 4 rope which had been lubricated soon after installation (and never since). These gates/ropes were in service approximately 15 years at the time of the inspection, and the results were as follows:

Gate No.	Lubricated	Broken Wires	Near Broken	Total
2	No	10	None	10
3	No	16	26	42
4	Yes	68	35	103

The conclusion was that "lubrication . . . appears to have done more damage than good." This conclusion appears valid as the average number of breaks plus near breaks for the non-lubricated ropes was 26 versus 103 for the lubricated rope. The report also mentioned that some of the lubricant is lost as a rope passes over sheaves and "This results in wire rope being substantially covered with lubrication but with substantial bare spots on the outer wires where contact was made with the sheave. Galvanic corrosion is then concentrated in these areas. This is evident when viewing the corroded areas . . . More frequent lubrication intervals may have increased the life of the rope by changing the bare spots on the wire rope where the concentrated corrosion starts."

(3) Additional information. In July 1966 a Missouri River Division issued a letter, subject: Lubrication of Stainless Steel Hoist Cables. This letter recommended against lubricating stainless steel wire rope.

h. Item No. 8. Telephone call from Seattle District.

(1) Gate and rope type. Not specified.

(2) Problem/solution. The Seattle District has been using a lubrication system which contains the rope and pumps lubricant into it and have been satisfied with the results.

(3) Additional information. For more information contact:

The Kirkpatric Group
401 S. Sherman Street, Suite 211
Richardson,TX
(972) 669-9988.